KREYN, M.G.

On the Transfer Function of a One-Dimensional Boundary Value Problem of Second Order.
DAN SSSR, n. Ser. 88, 405-408 (1953).

KREYN, M.G.

Mathematical Reviews
Vol. 15 No. 4
Apr. 1954
Analysis

8-24-54
LL

Krein, M. G. An analogue of the Čebyšev-Markov inequalities in a one-dimensional boundary problem. Doklady Akad. Nauk SSSR (N.S.) 89, 5–8 (1953). (Russian)

This paper outlines some results obtained by further exploiting the analogy between moment problems and boundary-value problems for second-order linear differential equations. The differential system and notation is that of the previous review. Let, further, ψ denote the solution of the differential equation satisfying $\psi(0, \lambda) = 0, \psi'(0, \lambda) = 1$. Initially the case where φ and ψ are in L_2 for all λ is considered, and an analogue of a theorem of Nevanlinna connected with moment problems is proved. This result characterizes the set of all spectral functions of the differential system, and gives a necessary and sufficient condition that a spectral function be orthogonal. Using this result a set of inequalities is obtained which are the analogue of some due to Čebyšev. An application gives the asymptotic formula for a spectral function obtained by Levitan [see the paper reviewed sixth above]. The method allows various refinements in the remainder estimate under certain additional assumptions on q. [Reviewer's note: the analogy between boundary-value problems and moment problems has also been considered by H. Weyl, Ann. of Math. (2) 36, 230–254 (1935)].

E. A. Coddington (Los Angeles, Calif.)

KREYN, M. G.

USSR/Mathematics - Boundry-Value Problems 11 Sep 53

"Theory of General Boundry-Value Problems for Elliptical Differential Equations," M. Sh. Birman, Leningrad Mining Inst

DAN SSSR, Vol 92, No 2, pp 205-208

Discusses certain problems connected with M. I. Visik's theory of general boundry problems for elliptic differential eqs (M. I. Visik, Trudy Mosk Mat Ob-va (Works of Moscow Math Soc), 1, 1952). Limits the discussion just to the case of the self-adjoint differential operator which utilizes the important results of M. G. Kreyn (Matem Sbor (Math Symposium), 20(62), 3, 1947) in the investigation. Cites related work of S. G. Mikhlin (Problema Minimuma Kvadratichnogo Funktsionala, 1952). Presented by Acad V. I. Smirnov 10 Jul 53.

269T72

KREYN, M. G.

1/2

Krein, M. G. On some cases of effective determination of the density of an inhomogeneous cord from its spectral function. Doklady Akad. Nauk SSSR (N.S.) 93, 617–620 (1953). (Russian) 62

Under certain conditions the boundary-value problem $y''+q(x)y+\lambda y=0$, $ay(0)+by'(0)=0$ on an interval $0\leq x<L$ $(L\leq\infty)$ determines a unique spectral function. The questions considered here are: (1) what conditions on a non-decreasing function τ are necessary and sufficient in order that it be a spectral function of a differential problem as above, and (2) given a spectral function how can the function q, and constants a, b be explicitly recovered? These problems are formulated in the slightly more general form of the equation

$$y(x)=y(0)+y'(-0)x-\lambda\int_0^x(x-s)y(s)dM(s),$$

where $0\leq x<L$ and $M(x)$ is interpreted as the mass of a vibrating string S on the interval $[0,x)$. Let φ, ψ be the solutions of the integral equation satisfying the initial conditions $y(0)=1$, $y'(-0)=0$ and $y(0)=0$, $y'(-0)=1$ respectively. The principal spectral function τ of S is the non-decreasing function on $0\leq t<\infty$, satisfying $\tau(0)=0$, (over)

Krein, M. G. 3/2

$\tau(t)=\tau(t-0)$, and

$$\lim_{x\to L}\frac{\psi(x,\lambda)}{\varphi(x,\lambda)}=\int_0^\infty\frac{d\tau(t)}{t-\lambda}\quad(\lambda \text{ non-}\epsilon\ (0,\infty))$$

[cf. Krein, same Doklady (N.S.) 87, 881–884 (1952); these Rev. 14, 868]. The first result is that a non-decreasing function τ on $0\leq t<\infty$, $\tau(0)=0$ (non-negative spectrum) is a principal spectral function of a string S if and only if $\int_0^\infty(1+t)^{-1}d\tau(t)<\infty$, and the mass distribution M is uniquely determined by τ. A second result gives various rules of comparison between strings S and S^* (that is their lengths L, L^*, and their masses M, M^*) provided one knows certain relations between their spectral functions τ and τ^*. These results are illustrated by constructing the string with spectral density

$$\frac{d\tau}{dt}=\frac{P(t)}{\pi t^{1/2}Q(t)}\quad(0\leq t<\infty),$$

where Q is a polynomial which is positive for $t\geq 0$, and P is a polynomial with real non-negative zeros and whose degree is less than or equal to that of Q. Various examples are given.

E. A. Coddington (Los Angeles, Calif.).

KREYN, M.G.

1/2

Krein, M. G. On inverse problems of the theory of filters and λ-zones of stability. Doklady Akad. Nauk SSSR (N.S.) 93, 767–770 (1953). (Russian)

Let $M(x)$ be a nondecreasing function on $(-\infty, \infty)$, $M(x)=M(x-0)$, and let there exist a $T>0$ such that $M(x+T)=M(x)+M(T)$. Let λ be a parameter and consider the equation

$$(*) \qquad y(x)=y(0)+y'(-0)x-\lambda\int_0^x (x-s)y(s)dM(s).$$

(If M is absolutely continuous and $\rho=M'$ then (*) is equivalent to $y''+\lambda\rho(x)y=0$ where ρ has period T.) Let $\phi(x;\lambda)$ and $\psi(x;\lambda)$ be the solutions of (*) satisfying $y(0)=1$, $y'(-0)=0$ and $y(0)=0$, $y'(-0)=1$ respectively. Let $A(\lambda)=(\phi(T;\lambda)+\psi'(T-0;\lambda))/2$. Then A is called the A-function associated with the mass distribution M. Necessary and sufficient that A be a A-function associated with some M is (1) $A(\lambda)=\prod(1-\lambda/a_j)$, $0<a_1<a_2<\cdots$ and (over)

Krein, M. G.

2/2

$\sum(1/a_j)<\infty$, and (2) all roots of $A^2(\lambda)-1=0$ are non-negative. Next let $\mu_1<\mu_2<\cdots$ be the simple roots of $A^2(\lambda)-1=0$. Let $\mu_0=0$ and let

$$R(\lambda)=\lambda\prod(1-\lambda/\mu_j),\quad \sum(1/\mu_j)<\infty.$$

Then R is called the filter function associated with M. Necessary and sufficient that an $R(\lambda)$ of the above form be a filter function for some M is that there exist entire functions (A, B) of genus zero and with positive roots which satisfy $A^2(\lambda)+R(\lambda)B^2(\lambda)=1$. Other results are given.

N. Levinson (Cambridge, Mass.).

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Kreyn, M. G.	Works on the theory of moments, on the inverse Sturm-Liouville theory and on the theory of stability	Moscow Mathematical Society

SO: W-30604, 7 July 1954

KREYN, M.G.

Fundamental approximation problem in the theory of extrapolation and filtration of stationary random processes. Dokl.AN SSSR 94 no.1:13-16 Ja '54. (MLRA 7:1)
(Approximate computation) (Probabilities)

KREYN, M.

No. 6

Krein, M. On a method of effective solution of an inverse boundary problem. Doklady Akad. Nauk SSSR (N.S.) 94, 987–990 (1954). (Russian)

Referring to an earlier paper [same Doklady (N.S.) 93, 617–620 (1953); these Rev. 15, 796] the author introduces

$$\Phi(t) = \int_0^\infty \frac{1-\cos \lambda^{1/2} t}{\lambda} d\tau(\lambda)$$

where τ is the spectral function. Necessary and sufficient conditions on Φ are given for Φ to be represented by some spectral function as above. Also a homogeneous integral equation with kernel $\Phi''(|t-s|)$ and depending on a parameter is given, the solution of which leads to the determination of the $M(x)$ that occurs in the operator of which τ is the spectral function. Reference to practical applications is made. *N. Levinson* (Cambridge, Mass.).

USSR/Mathematics

Card : 1/1

Authors : Kreyn, M. G.

Title : On integral equations leading to differential equations of the 2nd Order.

Periodical : Dokl. AN SSSR, Vol. 97, Ed. 1, 21 - 24, July 1954

Abstract : Several integral equations, containing certain continuous complex-number Kernels or continuous functions, are demonstrated. A theorem is then presented, stating that, if the demonstrated equations have only one continuous solution, the above continuous functions can be transformed into differential equations of the 2nd order. A parallel theorem supporting this premise is also demonstrated. Three USSR references; two of these, by the same author, published in Dokl. AN SSSR in 1953 and 1954.

Institution : Re Odessa Naval Engineering Institute

Presented by : Academician, A. N. Kolmogorov, April 1954

KREYN, M.G.

1-F/W

Krein, M. G. On an application of the fixed-point principle in the theory of linear transformations of spaces with an indefinite metric. Amer. Math. Soc. Transl. (2) 1(1955), 27–35.
Translated from Uspehi Mat. Nauk (N.S.) 5 (1950), no. 2(36), 180–190; MR 14, 56.

KREYN, M.G.

Krein, M. G., and Rehtman, P. G. Development in a new direction of the Čebyšev-Markov theory of limiting values of integrals. Uspehi Mat. Nauk (N.S.) 10, no. 1(63), 67-78 (1955). (Russian)

1-F/W

MS

This is a continuation of Krein's paper [Uspehi Mat. Nauk (N.S.) 6, no. 4(44), 3-120 (1951); MR 13, 445] in which, among other things, the theory of absolutely monotonic functions on an infinite interval was deduced from the theory mentioned in the title, which deals with questions connected with moment problems. Here the general moment problem $c_k = \int_E u_k(t)d\sigma(t)$ is dealt with when the set E consists of a point set with a single limit point. Markov's theorem on the maximum and minimum of $\int_E \Omega(t)d\sigma(t)$ is correspondingly extended. As applications, the authors deduce theorems, some old and some new, on absolutely monotonic functions on a finite interval.

R. P. Boas, Jr. (Evanston, Ill.).

1

KREYN, M.G.

USSR/Mathematics - Stability FD-3086

Card 1/1 Pub. 85 - 1/16

Author : Kreyn, M. G. (Odessa)

Title : Criteria of stable boundedness of solutions of periodic canonical systems

Periodical : Prikl. mat. i mekh., 19, Nov-Dec 1955, 641-680

Abstract : In his previous work ("Principal positions held in the theory of lambda-zones of stability of canonical system of linear differential equations with periodic coefficients," Sbornik pamyati A. A. Andronova [Symposium in honor of A. A. Andronov], Acad. Sci. USSR Press, 1955, 413-498) the author investigated the linear canonical differential system of 2m-th order of the form $dx/dt = JH(t)x$, $x =$ column vector $(x_1 \cdots x_{2m})$, where $H(t) = H(t+T) = \| h_{jk}(t) \|_1^{2m}$ is real symmetric periodic and summable in period-interval $(0,T)$ matrix function $J = ($[illegible]$)$, $I_m = \| d_{jk} \|_1^m$ (Kronecker delta d_{jk}). In the present work the author presents further conclusions from the principal results of the earlier work. He notes the allied problem of the inverted mathematical pendulum studied by P. L. Kapitsa ("Pendulum with vibrating support," Usp. fiz. nauk, 44, No 1, 1951; "Dynamic stability of pendulum in the case of an oscillating point of suspension," ZhETF, 21, No 5, 1951), the equation being $x'' + (\pm g/L - ew^2 \sin[wt+a])x = 0$.

Institution :

Submitted : July 30, 1955

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

KREYN, M. G.

USSR/Mathematics - Integral equations

Card 1/1 Pub. 22 - 3/54

Authors : Kreyn, M. G.

Title : About a new method of solving linear Integral equations of the first and the second kinds

Periodical : Dok. AN SSSR 100/3, 413-416, Jan. 21, 1955

Abstract : A new method of solving integral equations based on the spectral functions of one dimensional boundary problems is presented. Two rules, A and B, show how the integrals (1) and (8) can be solved by the appropriate formula. Six USSR references (1949-1954).

Institution : Odessa Thydrotechnical Institute

Presented by: Academician A. N. Kolmogorov, November 20, 1954

KREYN, M.G.

1

Krein, M. G. On determination of the potential of a particle from its S-function. Dokl. Akad. Nauk SSSR (N.S.) 105 (1955), 433-436. (Russian)

Let $S(k)$, $-\infty<k<\infty$, satisfy $|S(k)|=S(0)=1$, $S(-k)=\bar{S}(k)$, $\arg S(k)\to\arg S(0)$ and $k\to\infty$, and

$$S(k)=1+\int_{-\infty}^{\infty} e^{ikt}s(t)\,dt,$$

where $s(t)\in L(0,\infty)$. Then $S(k)$ is shown to be the S-function associated with a one dimensional wave equation. Other results are given.

N. Levinson.

KREIN, M. G.

SUBJECT	USSR/MATHEMATICS/Integral equations CARD 1/4 PG -326
AUTHOR	KREJN M.G.
TITLE	Continuous analogues of the theorems on polynomials being orthogonal on the unit circle.
PERIODICAL	Doklady Akad. Nauk 105, 637-640 (1955) reviewed 10/1956

From an earlier paper of the author (Doklady Akad. Nauk 45, 3 (1944)) there follows that if $H(t) = \overline{H(-t)}$ $(-\infty < t < +\infty)$ is a function being summable on every interval $(-r,+r)$ $(r < \infty)$ and if for every continuous function $\varphi(t)$ $(0 \leq t < \infty)$ the inequation

$$\int_0^r |\varphi(s)|^2 ds + \int_0^r \int_0^r H(t-s)\,\varphi(t)\,\overline{\varphi(s)}\,dt\,ds \geqslant 0 \qquad (0 < r < \infty)$$

is satisfied (where the equal sign only holds for $\varphi \equiv 0$), the Hermitean kernel $H(t-s)$ $(0 \leqslant t,\ s \leqslant r)$ for every positive r possesses a Hermitean resolvent $\Gamma_r(t,s) = \overline{\Gamma_r(s,t)}$ $(0 \leq t,\ s \leq r)$ which satisfies the relation

$$(1) \qquad \Gamma_r(t,s) + \int_0^r H(t-u)\,\Gamma_r(u,s)\,du = H(t-s) \qquad (0 \leq s,\ t \leq r)\ .$$

From a general formula (Krejn, Daklady Akad.Nauk 97, 1, (1954)) there follows

(2) $$\frac{\partial \Gamma_r(t,s)}{\partial r} = - \Gamma_r(r,s)\,\Gamma_r(t,r) \qquad (0 \leq r < \infty \;;\; 0 \leq r,\; t \leq r)$$

and besides

(3) $$\Gamma_r(t,s) = \Gamma_r(r-s, r-t).$$

Let be $$P(r;\lambda) = e^{i\lambda r}\Big(1 - \int_0^r \Gamma_r(s,0)e^{-i\lambda s}\,ds\Big)$$

$$0 \leq r < \infty$$

$$P_*(r;\lambda) = 1 - \int_0^r \Gamma_r(0,s)e^{i\lambda s}\,ds\ .$$

Then from (2) and (3) there follows

$$\frac{dP(r;\lambda)}{dr} = i\lambda P(r;\lambda) - \overline{A(r)}\,P_*(r,\lambda)$$

$$A(r) = \Gamma_r(0,r)$$

$$\frac{dP_*(r;\lambda)}{dr} = - A(r)\,P(r;\lambda)$$

wherefrom follows

$$|P_*(r,\lambda)|^2 - |P(r,\lambda)|^2 = 2\,\mathrm{Jm}\,\lambda \int_0^r |P(s,\lambda)|^2\,ds.$$

Thus all zeros of P lie in the upper half plane $\mathrm{Jm}\,\lambda \geq 0$.

For every finite function $f(r) \in L_2(0;\infty)$ holds

$$\int_0^{\infty} |f(r)|^2 dr = \int_{-\infty}^{+\infty} |F(\lambda)|^2 d\sigma(\lambda) \text{ , where } F(\lambda) = \int_0^{\infty} f(r)P(r;\lambda)dr$$

and $\sigma(\lambda)$ $(-\infty < \lambda < \infty;\ \sigma(0) = 0,\ \sigma(\lambda-0) = \sigma(\lambda))$ is a non-decreasing function which exists under the assumption (1) and which satisfies the relations

$$\int_{-\infty}^{\infty} \frac{d\sigma(\lambda)}{1+\lambda^2} < \infty$$

and

$$\int_0^t (t-s)H(s)ds = \int_{-\infty}^{+\infty} \left(1 + \frac{i\lambda t}{1+\lambda^2} - e^{i\lambda t}\right) \frac{d\sigma(\lambda)}{\lambda^2} + (i\gamma - \frac{\mu}{2} \text{ sign } t)t; \quad \gamma = \text{const.}$$

Thus the correspondence $f(r) \longrightarrow F(\lambda)$ generates a unitary mapping U_p of the whole $L_2(0,\infty)$ onto a part $L_2^{(\sigma)}$. From Krejn (Doklady Akad.Nauk 46, 8, (1948)) there follows: the mapping U_p is then and only then a unitary

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

Doklady Akad. Nauk 105, 637-640 (1955) CARD 4/4 PG - 326

mapping of the whole $L_2(0,\infty)$ onto the whole $L_2^{(\sigma)}$ if

(4) $$\int_{-\infty}^{+\infty} \frac{\ln \sigma'(\lambda)}{1+\lambda^2}\, d\lambda = -\infty .$$

Thus the following assertions are equivalent:
I. The integral (4) has a finite value.
II. At least for one λ ($Jm\,\lambda > 0$) the integral $\int_0^\infty |P(r,\lambda)|^2 dr$ has a finite value.
III. At least for one λ ($Jm\,\lambda > 0$), $P_*(r,\lambda)$ is bounded.
IV. On every bounded closed set of points λ in the open half plane $Jm\,\lambda > 0$ there exists a uniformly convergent limit value $\Pi(\lambda) = \lim_{r\to\infty} P_*(r,\lambda)$.

Many relations for $\Pi(\lambda)$ and further similar theorems and relations are formulated without proof.

INSTITUTION: Hydrotechnical Institute, Odessa.

KREYN, M.G.

1-F/W

Iohvidov, I. S.; and Krein, M. G. Spectral theory of operators in space with indefinite metric. I. Trudy Moskov. Mat. Obšč. 5 (1956), 367–432. (Russian)

A Hilbert space Π_n with an indefinite inner product is discussed. A basic axiom is the decomposability of Π_n into a direct sum of two subspaces Π_+ (n-dimensional) and Π_- (the orthogonal complement of Π_+) such that the inner product is positive definite on Π_+ and Π_-, provided with the norm $|x| = \sqrt{-(x, x)}$, is a Banach space. Furthermore, it is assumed that no subspace on which (x, x) is positive definite can have dimension above n. It is then shown that if P is an arbitrary subspace of dimension n, on which (x, x) is positive definite, then its orthogonal complement N, normed by $|\cdot|$ is a Banach space. If $\|x\| = \sqrt{[x, x]} = \sqrt{((x^P, x^P) - (x^N, x^N))}$, where x^{PN} are the components of x relative to P and N, then $\|\cdot\|$ and $|\cdot|$ are equivalent on N.

A linear set L is called degenerate in case $L \cap L^\perp \supset 0$ and $\neq 0$. If L is nondegenerate so is $L^\perp$ and $L^{\perp\perp} = L$. If L is nondegenerate and $\bar{L}$ is the closure of L relative to $\|\cdot\|$, then $\bar{L}$ is nondegenerate. If Π_n is separable, it possesses a semiorthonormal basis e_i, $(e_i, e_j) = 0$, $i \neq j$, $(e_i, e_i) = -1$, $1 \leq i \leq n$, $(e_i, e_i) = 1$, $i > n$.

4

3

IOHVIDOV, I.S. and KREYN, M.G.

A Riesz type representative for linear functionals on Π_n is obtained: $f \in \Pi_n^* \Rightarrow f(x) = (x, y)$, $y \in \Pi_n$. Hence the usual properties and types of operators are definable, and the expected properties of isometric, self-adjoint, etc., operators are derived. (A variation: the spectrum of a unitary operator U is symmetric with respect to the unit circle: $\lambda \in$ spectrum $U \Rightarrow \bar{\lambda}^{-1} \in$ spectrum U.)

Cayley transforms of closed operators are discussed and the standard results are proved. There is a discussion of defect indices.

A reduction theory seems to be limited to special operators and finite dimensional reducing subspaces: If $(Tx, Tx) > (x, x)$ for all $(x, x) \geq 0$, $x \neq 0$, there is an n-dimensional nondegenerate subspace T in which all the proper values of T are at least 1 in absolute value. Consequently, if U is unitary, there are two finite dimensional subspaces T and T' which reduce U and the proper values of U in T are all less or equal to 1 in absolute value, and the proper values of U in T' have modulus not less than 1.

4

2/3

IOHVIDOV, I. S. and KREIN, M.G

The finite dimensional reducing spaces of an arbitrary self-adjoint operator are then deduced via Cayley transforms. If $(Tx, Tx) > (x, x)$, all $x \neq 0$, the above can be specialized, in particular, if Π_n is of dimension N. Then Π_n can be split into an n- and an $(N-n)$-dimensional subspace, each of which reduces T.

Finally, a "general form" for unitary and semiunitary operators is derived. *B. Gelbaum.*

4

3/3

Smw
MT

KREIN, M. G.

SUBJECT USSR/MATHEMATICS/Differential equations CARD 1/1 PG - 782
AUTHOR KREJN M.G.
TITLE On the theory of accelerants and S-matrices of canonical differential systems.
PERIODICAL Doklady Akad.Nauk 111, 1167-1170 (1956) reviewed 5/1957

In the present paper numerous earlier results of the author (Doklady Akad. Nauk 97, 1,(1954); ibid. 105, 3,(1955); ibid. 105, 4 (1955)) are generalized to the case of systems of integral equations and differential equations.

INSTITUTION: Hydrotechnical Institute, Odessa.

Kreyn, M.G.

IOKHVIDOV, I.S.; KREYN, M.G.

"Spectral theory of operators in spaces with an indefinite valuation. Part 1." (Trudy Mosk.mat.ob-va vol.5, 1956) Trudy Mosk.mat.ob-va 6:486 '57. (MIRA 10:11)

(Operators (Mathematics))

GOKHBERG, I.TS.; KREYN, M.G.

Basic concepts of defective numbers, radical numbers, and indices of linear operators. Usp.mat.nauk 12 no.2(74):43-118 Mr-Ap '57. (MIRA 10:7)

(Operators(Mathematics))

KREYN, M.G.

Bari's bases of Hilbert's space. Usp.mat.nauk 12 no.3:333-341 My-Je '57. (MIRA 10:10)
(Functions, Orthogonal) (Hilbert space)

KREYN, M.G. (Odessa)

The eigenfunction A(λ) of a linear canonical system of differential equations of the second order with periodic coefficients. Prikl.mat. i mekh. 21 no.3:320-329 My-Je '57. (MIRA 10:10)

(Eigenfunctions) (Differential equations)

KREYN, M.G.

AUTHOR KREYN M.G. 20-5-6/67

TITLE On the Continuous Analogy of A CHRISTOFFEL Formula From the Theory of the Orthogonal Polynomial.
(O kontinual'nom analoge odnoy formuly Kristoffelya iz teorii ortogonal'nykh mnogochlenov -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 5, pp 970-973 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT $\varphi(r;\lambda)$ is assumed to be the solution of the differential system $d^2\varphi/dr^2-V(r)\varphi+\lambda\varphi=0, \varphi(0;\lambda)=1, \varphi'(0;\lambda)=h (0\leqslant r<r_\infty)$, $(S_{o,h})$. h is a certain real number, $V(r)(0\leqslant r<r_\infty; r_\infty\leqslant\infty)$ is a real steady function and λ is a complex parameter. At first some denotations are explained. A function of r, which is obtained from the formally formed WRONSKI determinant W for the functions $\varphi(r;\alpha_1),\dots,\varphi(r;\alpha_p)$ by a certain process of substitution, is denoted by the symbol $W_*(\varphi_{\alpha_1},\varphi_{\alpha_2},\dots,\varphi_{\alpha_p})$.

Further it is assumed that: $P(\lambda)=(\lambda-\alpha_1)(\lambda-\alpha_2)\dots(\lambda-\alpha_p)$.

$V_p(r)=V(r)-2(d^2/dr^2)\ln W_*(\varphi_{\alpha_1},\dots,\varphi_{\alpha_p})$, $\varphi_p(r;\lambda)=(-1)^pP^{-1}(\lambda)W_*(\varphi,\varphi_{\alpha_1},\dots,\varphi_{\alpha_p})/W_*(\varphi_{\alpha_1},\dots,\varphi_{\alpha_p})$.

Theorem 1: $\tau(\lambda)$ is assumed to be a certain spectral function of the system $(S_{o,h})$ and $P(\lambda)=\lambda^p+\dots+a_p$ is assumed to be a nonnegative polynomial. The function $\tau_p(\lambda)=\int_{-\infty}^{\lambda}P(\mu)d\tau(\mu)$ is then

Card 1/2

On the Continous Analogy of A CHRISTOFFEL Formula From the Theory of the Orthogonal Polynomial. 20-5-6/67

a spectral function of the differential system $\Psi'' - V_p(r)\Psi + \lambda\Psi = 0$, $\lim_{r \downarrow 0} r^{-p}\Psi(r;\lambda) 1/.3...(2p-1)$ with the steady potential $V_p(r)(0 \leq r < r_\infty)$. The function $\varphi_p(r;\lambda)$ is the solution $\Psi(r;\lambda)$ of this system. By means of this theorem and of earlier results a simple procedure for the determination of a differential system can be derived from their spectral function τ. Two further theorems are given.
(No illustrations)

ASSOCIATION Hydrotechnical Institute Odessa.
PRESENTED BY KOLMOGOROV A.N., Member of the Academy
SUBMITTED 24.9.1956
AVAILABLE Library of Congress
Card 2/2

Kreyn, M.G.

GOKHBERG, I.TS.; KREYN, M.G.

Systems of integral equations on a semisection with kernels depending on the difference of arguments. Usp.mat.nauk 13 no.2:3-72 Mr-Ap '58. (MIRA 11:4)
(Integral equations)

AUTHORS: Kats, I.S. and Kreyn, M.G. SOV/140-58-2-12/20

TITLE: A Criterion That the Spectrum of a Singular String is Discrete (Kriteriy diskretnosti spektra singulyarnoy struny)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy Ministerstva vysshego obrazovaniya SSSR, Matematika, 1958, Nr 2, pp 136-153 (USSR)

ABSTRACT: Let S be a string stretched between $x = 0$ and $x = L$ ($\leq \infty$) by a unit force. Let $M(x)$ be the mass of the interval $[0,x]$, where $M(0) = 0$. S is called sigular if L or $M(L-0)$ is infinite. For sigular strings it is assumed that $M(L) = M(L-0) = \lim_{x \uparrow L} M(x)$.

Such strings were treated already for several times by Kreyn [Ref 1,2,3]. In the present paper it is proved in detail that the following conditions are necessary and sufficient that the spectrum of the string is discrete:

1. $\lim_{x \to \infty} x[M(\infty)-M(x)] = 0$ in the case $L = \infty$
2. $\lim_{x \uparrow L} M(x)(L-x) = 0$ in the case $M(L) = \infty$.

Besides, in this connection, some further partially known results are given.

There are 7 Soviet references.

Card 1/2

A Criterion That the Spectrum of a Singular String is Discrete SOV/140 58-2-12/20

ASSOCIATION: Izmail'skiy gosudarstvennyy pedagogicheskiy institut
Odesskiy inzhenerno-stroitel'nyy institut
(Izmail State Pedagogical Institute
Odessa Institute for Construction Engineering)

SUBMITTED: November 15, 1957

Card 2/2

AUTHOR: Kreyn, M.G. SOV/42-13-5-1/13

TITLE: Integral Equations on the Halfline With a Kernel Depending on the Difference of the Arguments (Integral'nyye uravneniya na polupryamoy s yadrom, zavisyashchim ot raznosti argumentov)

PERIODICAL: Uspekhi matematicheskikh nauk, 1958, Vol 13, Nr 5, pp 3-120 (USSR)

ABSTRACT: The very significant paper, consisting of four chapters and 17 paragraphs, gives a general and in a certain sens complete theory of the integral equations

$$\text{(A)} \qquad \chi(t) - \int_0^\infty k(t-s)\,\chi(s)\,ds = f(t) \qquad (0 \leqslant t < \infty)$$

and

$$\text{(B)} \qquad \varphi(t) - \int_0^\infty k(t-s)\,\varphi(s)\,ds = 0.$$

The results are obtained by a skilful combination of the harmonic analysis (theorems of Wiener and Wiener-Loevy) and the theory of operators in Banach spaces. The following three theorems are most essential, in which E denotes a number of spaces, especially $L_p(0,\infty)$, $1 \leq p < \infty$, the space $M(0,\infty)$ of all bounded

Card 1/5

measurable functions, the space $M_c(0,\infty)$ of all bounded continuous functions etc.

Theorem 1: Let $k(t) \in L_1(-\infty,\infty)$. In order that (A) has a unique solution $\chi \in E$ for every $f \in E$ it is necessary and sufficient that

$$1-K(\lambda) \neq 0, \quad -\infty < \lambda < \infty, \quad K(\lambda) = \int_{-\infty}^{\infty} e^{i\lambda t} k(t)dt, \quad v = -\operatorname{ind}(1-K) = 0.$$

Then

$$\chi(t) = f(t) + \int_0^{\infty} \gamma(t,s)f(s)ds,$$

where

$$\gamma(t,s) = \gamma(t-s,0) + \gamma(0,s-t) + \int_0 \gamma(t-r,0)\gamma(0,s-r)dr$$

$$(0 \leq t,\ s < \infty,\ \gamma(t,0) = \gamma(0,t) = 0 \text{ for } t<0).$$

The functions $\gamma(t,0)$ and $\gamma(0,t)$ belong to $L_1(0,\infty)$ and are

Integral Equations on the Halfline With a Kernel Depending on the Difference of the Arguments SOV/42-13-5-1/15

determined uniquely by the following relations:

1) $(1-K(\lambda))^{-1} = \mathcal{G}_{+}(\lambda)\mathcal{G}_{-}(\lambda) \qquad (-\infty < \lambda < \infty)$

2) $\mathcal{G}_{+}(\lambda) = 1+\int\limits_0^\infty \Gamma(t,0)e^{i\lambda t}dt, \quad \mathcal{G}_{-}(\lambda) = 1+\int\limits_0^\infty \Gamma(0,t)e^{-i\lambda t}dt$

3) $\mathcal{G}_{+}(\lambda) \neq 0 \quad (\mathrm{Jm}\,\lambda \geq 0), \quad \mathcal{G}_{-}(\lambda) \neq 0 \quad (\mathrm{Jm}\,\lambda \leq 0)$.

If $k(t)$ is even, then $\mathcal{G}_{-}(\lambda) = \mathcal{G}_{+}(-\lambda)$; $\Gamma(t,0) = \Gamma(0,t)$.

Several methods for the determination of the functions are given.

Theorem 2: Let $k(t) \in L_1(-\infty,\infty)$ and $1-K(\lambda) \neq 0$. In order that (B) has a nontrivial solution in one of the E it is necessary and sufficient that $v = -\mathrm{ind}(1-K) > 0$. Then (B) has the same solutions in all E, the set of the solutions has a base of v functions $\varphi_0(t), \varphi_1(t), \ldots, \varphi_{v-1}(t)$ being absolutely continuous, tending to zero as $t \to \infty$, and being combined by the

Card 3/5

relations $\varphi_{k+1}(t) = \frac{d\varphi_k}{dt}$, $\varphi_k(0) = 0$ $(k=0,1,\ldots,v-2)$, $\varphi_{v-1}(0) \neq 0$.

The author gives analytic methods, with the aid of which this base can be constructed.

Theorem 3: Let $k(t) \in L_1(-\infty,\infty)$ and $1-K(\lambda) \neq 0$. If $v > 0$, then (A) has infinitely many solutions $\chi \in E$ for every $f \in E$. If $v\ 0$, then (A) has either no solution or only one solution for a given $f \in E$. The last case happens then and only then if

$$\int_0^\infty f(t)\,\psi_j(t)\,dt = 0 \qquad (j=0,1,\ldots,|v|-1),$$

where $\psi_j(t)$ is an arbitrary base of the set of all solutions of the transposed homogeneous equation.

These theorems and the proofs of them form the essential contents of the first two chapters. The third chapter contains analogous assertions for the infinite system of equations:

$$\sum_{s=0}^{\infty} k_{t-s}\chi_s = f_t \qquad (t=0,1,2,\ldots).$$

Integral Equations on the Halfline With a Kernel Depending on the Difference of the Arguments SOV/42-13-5-1/15

The fourth chapter treats (A) and (B) in the case of Wiener-Hopf, i.e. if $\exp(h|t|)k(t) \in L_1(-\infty,\infty)$, $h>0$.

The author remarks that the most essential parts of the present paper can also be extended to systems

$$\chi_p(t) - \sum_{q=1}^{n} \int_0^{\infty} k_{pq}(t-s)\chi_q(s)ds = f_p(t).$$

An appendix contains valuable hints to the literature. There are 53 references, 33 of which are Soviet, 10 English, 6 American, 2 German, 1 Polish, and 1 Belgian.

Card 5/5

AUTHOR: Gokhberg, I.Ts., Kreyn, M.G. 20-119-5-3/59

TITLE: On a Stable System of Partial Indices of the Hilbert Problem for Several Unknown Functions (Ob ustoychivoy sisteme chastnykh indeksov zadachi Gil'berta dlya neskol'kikh neizvestnykh funktsiy)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 5, pp 854-857 (USSR)

ABSTRACT: Let a contour Γ consisting of finitely many simple smooth closed oriented curves with a continuous curvature divide the complex plane into the regions D^+ and D^-. Let H denote the set of functions defined on Γ which satisfies a Hölder condition. Let $H_{(n\times n)}$ denote the set of all $n \times n$ matrices with elements of H. Analogously $H_{(n\times 1)}$ denotes the set of vectors with components of H. Let the norm in $H_{(n\times n)}$ be defined by

$$\|A\| = n \cdot \max_{t\in\Gamma} |a_{jk}(t)| \qquad (A(t) = \|a_{jk}(t)\|_1^n \in H_{(n\ n)}).$$

Let $A(t) \in H_{(n\times n)}$ be a non-singular matrix function and $\varkappa_1(A) \geqslant \varkappa_2(A) \geqslant \dots \geqslant \varkappa_n(A)$ be the partial indices of the Hilbert problem

$$\Phi^+(t) = A(t)\,\Phi^-(t).$$

Card 1/3

The system $\varkappa_j(a)$ $(j=1,2,\dots,n)$ is called stable if for A(t) there

exists a $\delta > 0$ such that every matrix $B(t) \in H_{(n \times n)}$ with $\|B-A\| < \delta$ has the same indices: $\varkappa_j(B) = \varkappa_j(A)$.

Theorem: Let $A(t) \in H_{(n \times n)}$ be non-singular and $\varkappa = \varkappa(A) = \frac{1}{2\pi}\left[\arg \det A(t)\right]_\Gamma$. The system of partial indices of the matrix $A(t)$ is stable then and only then if

$$\varkappa_1(A) = \dots = \varkappa_r(A) = q+1; \qquad \varkappa_{r+1}(A) = \dots = \varkappa_n(A) = q,$$

where the integers q, r are determined from the relation $\varkappa = qn+r$, $0 \leq r < n$.

Conclusion: In every neighborhood of a non-singular $A(t) \in H_{(n \times n)}$ there exist matrices $B(t) \in H_{(n \times n)}$ with a stable system of indices.

Theorem: Let $A(t) \in H_{(n \times n)}$ be non-singular. There exists a $\delta > 0$ such that every $B(t) \in H_{(n \times n)}$ with $\|B-A\| < \delta$ is non-singular and for every integral p there holds:

On a Stable System of Partial Indices of the Hilbert Problem for Several Unknown Functions 20-119-5-3/59

$$\sum_{\varkappa_j(A)>p} (\varkappa_j(A)-p) \quad \sum_{\varkappa_j(B)>p} (\varkappa_j(B)-p).$$

There are 7 Soviet references.

ASSOCIATION: Bel'tsskiy gosudarstvennyy pedagogicheskiy institut; Odesskiy inzhenerno-stroitel'nyy institut (Bel'tsy State Pedagogical Institute; Odessa Engineering Institute)

PRESENTED: December 3, 1957, by V.I.Smirnov, Academician

SUBMITTED: November 29, 1957

Card 3/3

KREYN, M.G.

16(0) PHASE I BOOK EXPLOITATION SOV/3360

Moskovskoye matematicheskoye obshchestvo

Trudy, t. 8 (Transactions of the Moscow Mathematical Society, Vol 8) Moscow, Fizmatgiz, 1959. 518 p. Errata slip inserted. 2,050 copies printed.

Ed.: A.P. Lapko; Tech. Ed.: S.S. Gavrilov; Editorial Board: P.S. Aleksandrov, I.M. Gel'fand, and O.N. Golovin.

PURPOSE: This book is intended for mathematicians and theoretical physicists.

COVERAGE: This book contains a collection of articles by leading Soviet mathematicians on problems in pure and applied mathematics. All articles were written in 1957 and 1958. Among the topics discussed are: analytic - operator functions, function spaces, nonstationary plane flow of a viscous non-compressible liquid, root spaces, products of groups representations, ordinary and partial differential equations, 3rd and 4th order linear equations, homogeneous spaces, spectral theory of operators, and generalized random processes. References accompany each article.

AVAILABLE: Library of Congress

Card 3/3

AC/gmp
1-12-60

IOKHVIDOV, I.S.; KREYN, M.G. (Odessa)

Spectrum theory of operators in spaces with an indefinite metric. Part 2. Trudy Mosk.mat.ob-va 8:413-496 '59.
(MIRA 13:2)

(Operators (Mathematics)) (Topology)

9

16(1)

AUTHOR: Kreyn, M.G. SOV/42-14-3-9/22

TITLE: On the Conditions of Completeness for the System of Root Vectors of a Dissipative Operator

PERIODICAL: Uspekhi matematicheskikh nauk, 1959, Vol 14, Nr 3, pp 145-152 (USSR)

ABSTRACT: Let $\mathfrak{H}$ be a separable Hilbert space, A a linear operator. The vector $\varphi \in \mathfrak{H}$ $(\varphi \neq 0)$ is called root vector of A which corresponds to the number λ_0, if it holds for a natural n : $\varphi \in \mathcal{D}(A^n)$ and $(A - \lambda_0 I)^n \varphi = 0$. A bounded operator A is called dissipative, if it is $(Hf, f) \geq 0$, where $f \in \mathfrak{H}$ and $H = \frac{1}{2i}(A - A^*)$.

Let the operator A be completely continuous and have the representation $A = G + iH$, where it is $G = \frac{1}{2}(A + A^*)$.

Let $\{e_j\}_1^\infty$ be a complete orthogonally normed system of

On the Conditions of Completeness for the System of Root Vectors of a Dissipative Operator SOV/42-14-3-9/22

eigen vectors of G, so that it is $G e_j = \mu_j e_j$. Let denote

$$Sp_+ G = \sum_{\mu_j > 0} \mu_j \quad , \quad Sp_- G = \sum_{\mu_j < 0} \mu_j$$

If the two magnitudes are finite, then $Sp\,G = Sp_+ G + Sp_- G$ is called the absolutely convergent trace of G.

Theorem: The system of the root vectors of a completely continuous dissipative operator $A = G + iH$ is complete, if SpH and at least one of the magnitudes $Sp_+ G$ or $Sp_- G$ are finite.

Theorem: The system of the root vectors of a completely continuous dissipative operator $A = G + iH$ is complete, if G possesses an absolutely convergent trace.

V.B. Lidskiy and L.A. Sakhnovich are mentioned in the paper.

Card 2/3

On the Conditions of Completeness for the System of Root Vectors of a Dissipative Operator SOV/42-14-3-9/22

The author thanks B.Ya. Levin for valuable suggestions.

There are 8 references, 7 of which are Soviet, and 1 Swedish.

SUBMITTED: November 19, 1958

5

16(1)

AUTHOR: Kreyn, M.G. SOV/20-125-1-6/67

TITLE: On the Integral Representation of a Continuous Hermitean Indefinite Function With a Finite Number of Negative Squares (Ob integral'nom predstavlenii nepreryvnoy ermitovo indefinitnoy funktsii s konechnym chislom otritsatel'nykh kvadratov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 1, pp 31-34 (USSR)

ABSTRACT: Let $\varkappa \geqslant 0$, integral; $\mathfrak{P}_{\varkappa, a}$, $0 < a \leqslant \infty$, denote the class of continuous Hermitean functions $f(x) = \overline{f(-x)}$, $-a < x < a$, with the property that the form

$$\sum_{j,k=1}^{n} f(x_j - x_k) \xi_k \bar{\xi}_j$$

for arbitrary $x_1, x_2, \ldots, x_n$ of $[0, a)$ has not more than $\varkappa$ negative squares and a form has exactly $\varkappa$ such squares.
The paper contains integral representations for arbitrary functions $f(x) \in \mathfrak{P}_{\varkappa, \infty}$, $\varkappa > 0$. The results are given in three theorems. By a misprint the assumptions can not be understood.

Card 1/2

On the Integral Representation of a Continuous Hermitean Indefinite Function With a Finite Number of Negative Squares SOV/20-125-1-6/67

In the session of the Physical-Mathematical Section of the Academy of Sciences of the UkrSSR on April 16, 1958, there was a report on the present paper. From the announced theorems there result as conclusions the results of B.V.Gnedenko, M.S. Pinsker, and A.M.Yaglom.
There are 9 Soviet references.

PRESENTED: November 26, 1958, by A.N.Kolmogorov, Academician

SUBMITTED: November 24, 1958

Card 2/2

16(1)

AUTHORS: Gokhberg, I.Ts., and Kreyn, M.G. SOV/20-128-2-2/59

TITLE: Completely Continuous Operators With a Spectrum Concentrated in Zero

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 227-230 (USSR)

ABSTRACT: Let γ_p $(0 < p < \infty)$ be the set of all linear bounded operators A in the separable Hilbert space $\mathfrak{H}$, where $N_p(A) = [Sp(A^*A)^{p/2}]^{1/p} < \infty$. Let γ_∞ be the set of all linear completely continuous operators in $\mathfrak{H}$, $\|A\|_\infty = \max(\|Af\|/\|f\|)$. The operator function P(t) $(0 \leqslant t \leqslant 1,\ P(o) = 0,\ P(1) = I)$ the values of which are orthogonal projectors, is called a spectral operator function if it does not decrease and is continuous from the left hand side. Let

(1) $$A = 2i \int_0^1 P(t)HdP(t),$$

where A,H are linear bounded operators and P(t) is a spectral operator function, converge in γ_p if $\|A - 2i \sum_{j=1}^{n} P(\tau_j)H(P(t_j) - P(t_{j-1}))\|_p$ $\rightarrow 0$ for $0 = t_0 \leqslant \tau_1 \leqslant t_1 \leqslant \ldots \leqslant t_{n-1} \leqslant \tau_n \leqslant t_n = 1$ and

Card 1/3

$\max_k (t_k - t_{k-1}) \to 0$.

Theorem 1: Let $H \in \sigma_2$ and $P(t)$ $(0 \leq t \leq 1)$ be a continuous spectral operator function. Then (1) converges in σ_2.

A linear completely continuous operator A is called a Volterra-operator if it has no eigenvalues different from zero.
Theorem 2: Let P(t) be a continuous spectral operator function, let H be selfadjoint in σ_2. Then the operator A defined by (1) has the properties 1. $A \in \sigma_2$, 2. A - Volterraian, 3. the imaginary Hermitean component of A is identical with H: Ay = H, 4. $P(t)AP(t) = AP(t)$ $(0 \leq t \leq 1)$, 5. A is the single linear bounded operator with the properties 3. and 4.
Theorem 3: Every Volterra-operator A with $A_I \in \sigma_2$ can be represented in the form H = Ay after an unessential extension by (1).
Theorem 4: Let A be a Volterra-operator, $Ay \in \sigma_1$. Then $A_R \in \sigma_p$ for all $p > 1$ and furthermore:

(3) $\|A\|_p \leq \frac{4}{\pi} \left(\sum_{j=-\infty}^{\infty} \frac{1}{(2j-1)^p} \right)^{1/p} Sp\,|A_y| \qquad (Sp\,|A| = \|A\|_1)$,

(4) $\left(\sum_{j=1}^{\infty} |\mu_j|^{-p} \right)^{1/p} \leq \frac{2}{\pi} \left(\sum_{j=-\infty}^{\infty} \frac{1}{(2j-1)^p} \right)^{1/p} Sp\,|A_y|$,

where $\mu_j = \lambda_{jR}^{-1}$ form a complete system of characteristic numbers of A_R.

The authors mention M.S.Brodskiy, L.A.Sakhnovich, and M.S.Livshits. There are 10 references, 9 of which are Soviet, and 1 American.

ASSOCIATION: Odesskiy inzhenerno-stroitel'nyy institut (Odessa Institute of Civil Engineers)

PRESENTED: May 18, 1959, by S.L.Sobolev, Academician

SUBMITTED: May 13, 1959

Card 3/3

KREYN, M. G. (Odessa)

"On Ship Contours having minimum total drag values."

with Sizov, V. G. "

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 -Jan - 3 Feb 1960

KREYN, M.G.; SHILOV, G.Ye.

Mark Aronovich Naimark; on his fifthieth birthday. Usp. mat. nauk 15 no.2:231-236 Mr-Ap '60. (MIRA 13:9)
(Naimark, Mark Aronovich, 1909-)

16(1)

SOV/20-130-2-3/69

AUTHOR: Kreyn, M.G.

TITLE: A Contribution to the Theory of Linear Non-selfadjoint Operators

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Nr 2, pp 254-256 (USSR) Vol 130

ABSTRACT: Let be a separable Hilbert space, the linear ring of all linear bounded operators in ; the two-sided ideal of all completely continuous operators in ; the two-sided ideal of all operators A with the property that

$Sp\ (A^{*}A)^{1/2}$ ∞.

The operator A is called dissipative, if in its decomposition into Hermitean components $A = A_R + i\ A_I$ the imaginary component A_I is a nonnegative operator.

Theorem 1: Let A = G + i H (H = A y) be dissipative; B = G + i F, where - H F H. For Im 0 the operator

$$W = I + i\ (H - F)^{1/2}\ (A - I)^{-1}\ (H - F)^{1/2}$$

Card 1/4

16(1)
A Contribution to the Theory of Linear Non-selfadjoint Operators SOV/20-130-2-3/69

has the property

W f f (f)

Theorem 2 : If the operators A and B satisfy the conditions of theorem 1 and if Sp H $<\infty$, then it is

$$D_{B/A}( ) 1 \quad \text{for Im } \lambda > 0 .$$

Here it is

$$D_{B/A}( ) = \det (I - B)(I - \lambda A)^{-1}$$

Theorem 3 : If A = G + i H , H , then the function $D_{G/A}( )$ is representable in the upper (or lower) half plane Im λ 0 (or Im 0) as the quotient of two bounded holomorphic functions.
Theorem 4 : If A = G + i H is of Volterra type and H , then the entire function $f( ) = D_{G/A}(\lambda)$ exp (-i λ Sp H)

Card 2/4

67549

A Contribution to the Theory of Linear Non-selfadjoint Operators

SOV/20-130-2-3/69

has the properties

(1) $\ln f(\ ) - 0 (\quad)$ for $\lambda \to \infty$; $\int\limits_{-\infty}^{\infty} \frac{|\ln|f(\lambda)||}{1+\lambda^2} d\lambda < \infty$

and is representable as

$f(\ ) = \ _j (1 - \ / \ _j) e^{\ / \ _j}$

where $\ _j$ is the complete sequence of the characteristic numbers of A. This sequence has the limit value

$$\frac{h}{\ } = \lim_{r\ \infty} \frac{n+ (r;G)}{r} = \lim_{r \to \infty} \frac{n- (r;G)}{r}$$

where Sp H h Sp H (= Sp H_+ + Sp H_-) . If A is dissipative, then it is h = Sp H . n_+ and n_- denote the number

Card 3/4

6

A Contribution to the Theory of Linear Non-selfadjoint Operators SOV/20-130-2-3/69

of the characteristic numbers of A (considering the multiplicities) in (0,r or -r,0 .

The author gives four further theorems of related content. He mentions M.S. Livshits, M.S. Brodskiy and B.Ya. Levin. There are 9 references, 8 of which are Soviet, and 1 American.

ASSOCIATION: Odesskiy inzhenerno-stroitel'nyy institut (Odessa Civil Engineer Institute)

PRESENTED: September 16, 1959, by S.L. Sobolev, Academician

SUBMITTED: September 16, 1959

Card 4/4

KREYN, M. G. and YAKUBOVICH, V. A.

"Hamiltonian systems of linear differential equations with periodic coefficients"

report submitted for the Intl. Symposium on Nonlinear Vibrations, IUPAM, Kiev Sept 12-18 1961.

Acad. Sci. Ukr SSR

GOKHBERG, I.TS.; KREYN, M.G.

Effect of some transformations of the kernels of integral equations on the spectra of these equations. Ukr. mat. zhur. 13 no.3:12-38 '61. (MIRA 14:9)

(Transformations (Mathematics))
(Integral equations)

KREYN, M.G.; LEVIN B.Ya.

Naum Il'ich Akhiezer; on his 60th birthday. Usp. mat. nauk 16 no.4:224-234 Jl-Ag '61. (MIRA 14:8)
(Akhiezer, Naum Il'ich, 1901-)

89385

S/040/61/025/001/004/022
B125/B204

9,1300 (also 1006)

AUTHORS: Kreyn, M. G., Lyubarskiy, G. Ya. (Odessa, Khar'kov)

TITLE: The theory of pass bands of periodic waveguides

PERIODICAL: Prikladnaya matematika i mekhanika, v. 25, no. 1, 1961, 24-37

TEXT: In the present paper, periodic waveguides are investigated. The propagation of an acoustic wave with the frequency ω in a waveguide is described by $\Delta\varphi + \frac{\omega^2}{c^2}\varphi = 0$ (0.1). Here, φ is the velocity potential ($\vec{v} = \mathrm{grad}\,\varphi$), $c = c(x,y,z)$ is the velocity of sound. On the boundary of the waveguide $\frac{\partial\varphi}{\partial n} = 0$ (0.2) holds. Here periodic waveguides (period l) are investigated; such a cell is assumed to be a waveguide filled with a homogeneous dielectric and bounded by two metal surfaces $y = y_1(x)$, $y = y_2(x)$ $(-\infty < x < \infty)$. Electromagnetic oscillations are investigated, for which Eq. (0.1) also holds; c is then the velocity of

Card 1/7

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

89385

S/040/61/025/001/004/022
B125/B204

The theory of pass bands of ...

light in the dielectric. Frequencies $\omega_1(k) \leqslant \omega_2(k) \leqslant \dots \leqslant \omega_n(k) \leqslant \dots$
..., Im k = 0 are to be determined at which (0.1) has a solution of
the type $\varphi(x,y,z) = e^{ikx}\psi(x,y,z)$, $\psi(x+l,y,z) = \psi(x,y,z)$ and
satisfies the boundary conditions (0.2) (problem A_1) (problem A_2) (0.3)
respectively. The frequencies $\omega_n(k)$ are periodic functions of k with
the period $2\pi/l$. The interval passing through from $\omega_n(k)$ at a variation
of k between 0 and π/l is called n-th pass band. A single "cell" V
of the waveguide is assumed to be bounded by the smooth surface S and
the surface S'. In all points n (ξ,η,ζ) located on S, and the correspond-
ing points $(\xi+l,\eta,\zeta)$ on S', $\varphi(\xi+l,\eta,\zeta) = e^{ikl}\varphi(\xi,\eta,\zeta)$,
$\frac{\partial}{\partial n}\varphi(\xi+l,\eta,\zeta) = e^{ikl}\frac{\partial}{\partial n}\varphi(\xi,\eta,\zeta)$ (1.1) holds. The natural frequencies
$\omega_n^2(k)$ of the self-adjoint boundary value problem have minimaximal

Card 2/7

S/040/61/025/001/004/022
B125/B204

The theory of pass bands of ...

properties: $\omega_n^2(k) = \max\limits_{(u_1,\ldots,u_{n-1})} \inf\limits_{(u \perp u_1,\ldots,u_{n-1})} \frac{I_1\{u\}}{I_2\{u\}}$ (1.3).
From (1.3) there follows: 1) The $\omega_n(k)$ depend monotonically and continuously on $\rho(x,y,z) = c^{-2}(x,y,z)$. The increase $\delta\omega_n^2(k)$ due to $\delta\rho$ satisfies $\left|\frac{\delta\omega_n^2(k)}{\omega_n^2(k)}\right| \leqslant \sup\limits_{x,y,z} \left|\frac{\delta\rho(x,y,z)}{\rho(x,y,z)}\right|$. 2) Every deformation neither changing V nor decreasing the period of the waveguide surface increases all eigenfrequencies $\omega_n(k)$ of the problems $A_2(S)$ and A_2. 3) ω_n is a prime number, and the corresponding eigenfunction is positive within V. The eigenfrequencies of the problems $A_i'(S)$ and $A_i''(S)$ (i = 1,2) are expressed by $\Omega_{in}(S)$ and $\omega_{in}(S)$. Also these frequencies have minimaximal properties. $\omega_n(S) \leqslant \omega_n(k) \leqslant \Omega_n(S)$ (2.3) holds. This has

Card 3/7

89385

been derived already in 1946 by V. V. Vladimirskiy (Ref. 5) and somewhat later by T. M. Karaseva and G. Ya. Lyubarskiy (Ref. 6). For the first pass band $\omega_1(\pi/l) = \Omega_1(\sigma)$ holds, its upper limit is a "π-wave" (i.e. the frequency $\omega_1(\pi/l)$ corresponding to the oblique periodic function $\varphi_1(x,y,z,\pi/l)$) and its lower limit is the frequency $\omega_1(0)$ corresponding to the periodic function $\varphi_1(x,y,z,0)$. The function $\frac{1}{2}\left[\varphi(x,y,z,k) + \varphi(-x,y,z,k)\right] = \psi(y,z) \cos kx$, at $k = \pi/l$ is a π-wave.

Theorem 2.2: The cylinder C with the volume V is assumed to have a cross section x = const of constant size and form. The cylinder is assumed to be bounded by the two parallel surfaces S and S'. The first natural frequency $\omega_1(S)$ of the problem $\Delta\varphi + \frac{\omega^2}{c^2(y,z)}\varphi = 0$ $\varphi = 0$ on S and S' assumes the lowest value, if S is the normal section of the cylinder. For the group velocity

89385

The theory of pass bands of ...

S/040/61/025/001/004/022
B125/B204

$$\frac{d\omega_n}{dk} = \frac{1}{2\omega_n(k_o)} S(\varphi_n,k); \quad S(\varphi_n,k) = \frac{i}{I_2\{\varphi_n\}} \iint_V \left[\varphi_n \frac{\partial \bar{\varphi}_n}{\partial x} - \bar{\varphi}_n \frac{\partial \varphi_n}{\partial x}\right] dydz \quad (3.3)$$

holds. Further, the estimate (3.4a) holds, which means that the group velocity is not greater than the greatest local signal velocity.

$$\left|\frac{d\omega_n}{dk}\right| \leqslant \frac{1}{\omega_n J_2(\varphi_n)} \int_V \left|\varphi_n \frac{\partial \varphi_n}{\partial x}\right| dv \leqslant \frac{1}{\omega_n J_2(\varphi_n)} \left(\int_V |\varphi_n|^2 dv \int_V |\operatorname{grad} \varphi_n|^2 dv\right)^{1/2} \leqslant$$

$$\leqslant \left(\frac{1}{J_2(\varphi_n)} \int_V |\varphi_n|^2 dv\right)^{1/2} \leqslant \max_{x,y,z} c(x,y,z) \qquad (3,4a)$$

Herefrom if follows for the width of each pass band that $\Delta\omega_n \leqslant \frac{\pi}{l} \max_{x,y,z} c\,(x,y,z)$ (3.6). For the collisions of the multiplier viz. the following theorems hold among others: Theorem 4.1: The multipliers $\varsigma_n(\omega)$ are symmetric to the unit circle if ω is real.

Card 5/7

89385

The theory of pass bands of ...

S/040/61/025/001/004/022
B125/B204

Theorem 4.2: The $\rho_n(\omega)$ are symmetric to the real axis. Theorem 4.3: The multiplier $\rho_n(\omega)$ cannot leave the real axis towards the unit circuit as long as it does not meet another multiplier. Finally, the limits of the first pass band are estimated (formulas 5.5, 5.6, 5.9, 5.10, 5.11, 5.12), and in the appendix (§ 6) the analyticity of the functions $\omega_n(k)$ are investigated.

$$\lambda = \int_V \left\{\left|\frac{\partial\varphi_1}{\partial y}\right|^2 + \left|\frac{\partial\varphi_1}{\partial z}\right|^2\right\} dv \Big/ \int_V |\varphi_1|^2 dv$$

Из (5.4) следует, что

$$\omega_1^2\left(\frac{\pi}{l}\right) \geqslant \inf_u \frac{1}{J_1(u)}\left(\int_V \left\{\left|\frac{\partial u}{\partial x}\right|^2 + \lambda_1 |u|^2\right\} dv\right) \geqslant$$

$$\geqslant \min_{(y,z)} \inf_u \left(\int_0^l \left\{\left|\frac{\partial u}{\partial x}\right|^2 + \lambda_1 |u|^2\right\} dx \Big/ \int_0^l |u|^2 \frac{dx}{c^2(x,y,z)}\right) \qquad (5.5)$$

где

$$\lambda_1 = \inf_v \left(\int_S \left\{\left|\frac{\partial v}{\partial y}\right|^2 + \left|\frac{\partial v}{\partial z}\right|^2\right\} dy\, dz \Big/ \int_S |v|^2 dy\, dz\right) \qquad (5.6)$$

Card 6/7

89385
S/040/61/025/001/004/022
B125/B204

The theory of pass bands of ...

$$\omega_1^2(k) \leqslant \inf_v \frac{J_1(u(y,z)e^{ikx})}{J_2(u(y,z))} = \inf_u \frac{\int\limits_S (|\operatorname{grad} u(y,z)|^2 + k^2|u|^2)\,dy\,dz}{\int\limits_S |u(y,z)|^2 \left[\frac{1}{l}\int\limits_0^l \frac{dx}{c^2(x,y,z)}\right] dy\,dz} \quad (5.9)$$

$$\omega_1(0) \leqslant \frac{2.405\ldots}{R}\left[\min_r \frac{1}{2\pi l}\int\limits_0^l\int\limits_0^{2\pi} \frac{d\varphi\,dx}{c^2[x,r,\varphi]}\right]^{-1/2} \quad (5.12)$$

M. I. Vishik and L. H. Lyusterik are mentioned. There are 3 figures and 11 references: 10 Soviet-bloc and 1 non-Soviet-bloc.

SUBMITTED: July 16, 1960

Card 7/7

GOKHBERG, I.TS.; KREYN, M.G.

Theory of triangular representations of non-self-adjoint operators.
Dokl.AN SSSR 137 no.5:1034-1037 Ap '61. (MIRA 14:4)

1. Moldavskiy filial AN SSSR i Odesskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom A.N.Kolmogorovym.
(Operators (Mathematics)) (Hilbert space)

GOKHBERG, I.TS.; KREYN, M.G.

Volterra operators with an imaginary component of any class. Dokl. AN SSSR 139 no.4:779-782 Ag '61. (MIRA 14:7)

1. Moldavskiy filial AN SSSR i Odesskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom A.N. Kolmogorovym.
(Operators (Mathematics)) (Spaces, Generalized)

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

16.3400

S/038/62/026/004/001/002
B112/B104

AUTHORS: Kreyn, M. G., and Lyubarskiy, G. Ya.

TITLE: Analytical properties of multiplicators to periodic canonical differential systems of a positive type

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya matematicheskaya, v. 26, no. 4, 1962, 549-572

/B

TEXT: The canonical system of differential equations $dx/dt = J(H_0(t) + \lambda H_1(t))x$ (A) is considered. The matrices H_0 and H_1 are assumed to be periodic with the period T. The eigenvalues of the monodromy matrix of the system (A) are called multiplicators of (A). Their analytical dependence on the parameter λ is investigated by applying the perturbation theory of selfadjoint operators as in a previous paper by these authors (Prikladnaya matematika i mekhanika, v. 25, no. 1 (1961), 24 - 37).

SUBMITTED: January 25, 1961

Card 1/1

KREYN, M.G.

Perturbation determinants and trace formula for unitary and self-adjoint operators. Dokl.AN SSSR 144 no.2:268-271 My '62. (MIRA 15:5)

1. Odesskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom V.I.Smirnovym.

(Operators (Mathematics))

S/020/62/144/003/001/030
B112/B104

AUTHORS: Birman, M. Sh., and Kreyn, M. G.

TITLE: Theory of wave and scattering operators

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 475-478

TEXT: The concept of wave operators is applied to the case of a pair of unitary operators. For unitary operators different from kernel operators, the existence of such wave operators is established. Carrying out a Cayley transformation, the authors obtain wave operators for a pair of selfadjoint operators under an unambiguous condition concerning the kernel difference of the resolvents. Using wave operators, a scattering operator is set up in a well-known manner, which serves to generate an S-matrix (scattering matrix). Certain spectral properties of the scattering matrix are investigated.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov). Odesskiy inzhenerno-stroitel'nyy institut (Odessa Construction

Card 1/2

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

Theory of wave and ... S/020/62/144/003/001/030
B112/B104

Engineering Institute)

PRESENTED: January 5, 1962, by V. I. Smirnov, Academician

SUBMITTED: December 27, 1961

Card 2/2

GOKHBERG, I.TS.; KREYN, M.G.

On the problem of factorization of operators in Hilbert space. Dokl. AN SSSR 147 no.2:279-282 N '62. (MIRA 15:11)

1. Odesskiy inzhenerno-stroitel'nyy institut i Institut fiziki i matematiki AN Moldavskoy SSR.

(Operators (Mathematics))
(Hilbert space)

KREYN, M.G. (Odessa)

"Problems and results of the parametric resonance mathematical theory of systems with a finite and infinite number of the degrees of freedom".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

KREYN, M.G.; LANGER, G.K.

Spectral function of a self-adjoint operator in a space of indefinite metric. Dokl. AN SSSR 152 no.1:39-42 S '63. (MIRA 16:9)

1. Odesskiy inzhenerno-stroitel'nyy institut i Drezdenskiy tekhnicheskiy universitet, Drezden, Germanskaya Demokraticheskaya Respublika. Predstavleno akademikom L.S.Pontryaginym.
(Operators (Mathematics)) (Hyperspace)

ACC NR: AM6011528 Monograph UR

Gokhberg, Izrail' TSudikovich; Kreyn, Mark Grigor'yevich

Introduction to the theory of linear non-self adjoint operators in Hilbert space (Vvedeniye v teoriyu lineynykh nesamosopryazhennykh operatorov v gil'bertovom prostranstve) Moscow, Izd-vo "Nauka", 1965. 448 p. biblio., index. 8500 copies printed.

TOPIC TAGS: Hilbert space, operational calculus, mathematic operator, linear operator

PURPOSE AND COVERAGE: This book deals with non-self-adjoint operators which are essential to mathematical study of processes which take place in nonconservative systems which play a large role in modern physics and mechanics. For the first time a well-developed elucidation of a number of methods of the theory of non-self-adjoint operators in Hilbert space (the method of estimating resolvents, the method of perturbation determinants, various asymptotic methods, et cetera) is presented. In addition, new methods are presented for obtaining various bounds, inequalities, and relationships for eigenvalues and singular values of completely continuous operators. A complete theory of symmetrically normed ideals of completely continuous operators is presented along with the use of these methods, in particular, such

UDC 519.55

Card 1/3

ACC NR: AM6011528

important nuclear operators as the Hilbert-Schmidt operators and others. Material in this book can be used in university courses in linear algebra, integral equations, and functional analysis. The book is intended for scientists, graduate students, and senior students studying mathematics, mechanics, and theoretical physics.

TABLE OF CONTENTS [abridged]:

Card 2/3

ACC NR: AM6011528

SUB CODE: 12/ SUBM DATE: 29Oct65/ ORIG REF: 060/ OTH REF: 045

Card 3/3

ACC NR: AP7005418 SOURCE CODE: UR/0020/66/169/006/1269/1272

AUTHOR: Kreyn, M. G.; Saakyan, Sh. N.

ORG: Odessa Construction Engineering Institute (Odesskiy inzhenerno-stroitel'nyy institut); Institute of Mathematics and Mechanics, AN ArmSSR (Institut matematiki i mekhaniki AN ArmSSR)

TITLE: Some new results in the theory of resolvents of hermitian operators

SOURCE: AN SSSR. Doklady, v. 169, no. 6, 1966, 1269-1272

TOPIC TAGS: Hilbert space, mathematic operator

ABSTRACT: Let $\mathfrak{H}$ be a Hilbert space and A a certain simple closed Hermitian operator acting in $\mathfrak{H}$ with domain of definition $\mathfrak{D}(A)$ dense in $\mathfrak{H}$ and having equal defective numbers $n_+(A) = n_-(A)$ ($\equiv n(A)$). It is assumed that $\mathfrak{M}_z = (A - zI)\,\mathfrak{D}(A)$ (so that $n(A) = \dim(\mathfrak{H} \ominus \mathfrak{M}_z)$, given $\operatorname{Im} z \neq 0$). In 1943, independently of each other, M. A. NAYMARK and M. G. KREYN (the latter in an article published in 1944) obtained a description of all generalized resolvents of Hermitian operator A with n (A) = 1. Later these results were generalized by KREYN for the case of any natural n (A) and by A. V. SHTRAUS for the case of any equal or unequal $n_{\pm}(A) \leqslant \infty$. However, it was only in the 1944 article by KREYN that a description was given of generalized resolvents by means of a resolvent matrix. This description was adapted by KREYN for purposes of the theory of integral Hermitian operators and the general theory of the representation of Hermitian operators; and the result was generalized by KREYN for the case of any natural n (A), but this was never published.

Card 1/2 UDC: 513.88+517.948.35+517.948.5

0926 2283

ACC NR: AP7005418

The present article sets forth the principal theses of the theory of a resolvent $\mathcal{L}$-matrix in the general case $n(A) \leq \infty$. Systematic use is made of the projector function $\mathcal{P}(z)$ and the associated operator function $Q(z)$, which are generated by operator A and the subspace of representation $\mathcal{L}$, to write, in a new compact form, correlations which were previously established only for particular cases ($n(A) = 1$ or $n(A) < \infty$).

The authors thank Yu. L. SHMUL'YAN for the use of his records wherein are systematized communications by KREYN, dated 1957, pertaining to the case $n(A) < \infty$. This paper was presented by Academician P. S. Aleksandrov on 2 December 1965. Orig. art. has: 8 formulas. [JPRS: 38,695]

SUB CODE: 12 / SUBM DATE: 01Dec65 / ORIG REF: 013

Card 2/2

L 44082-66 EWP(k)/EWT(d)/EWT(m)/T-2/EWP(w) IJP(c) EM/WW/JD

ACC NR: AT6016796 (N) SOURCE CODE: UR/0000/65/000/000/0283/0322

AUTHOR: Kreyn, M.G.; Langer, G.K.

ORG: [Kreyn] Odessa Civil Engineering Institute, Odessa, SSSR (Odesskiy inzhenerno-stroitel'nyy institut); [Langer] Dresden Technical University, Dresden, GDR (Technische Universitat Dresden)

TITLE: Some mathematical principles of the linear theory of damped vibrations of continua

SOURCE: International Symposium on Applications of the Theory of Functions in Continuum Mechanics. Tiflis, 1963. Prilozheniya teorii funktsiy v mekhanike sploshnoy sredy. t. 2: Mekhanika zhidkosti i gaza, matematicheskiye metody (Applications of the theory of functions in continuum mechanics. v. 2: Fluid and gas mechanics mathematical methods); trudy simpoziuma. Moscow, Izd-vo Nauka, 1965, 283-322

TOPIC TAGS: solid mechanics, motion mechanics, periodic motion, linear operator, mechanical vibration, forced vibration, vibration damping, mathematic operator, Hilbert space

ABSTRACT: The linear equation of small vibrations of the continuum S (with an arbitrary number of dimensions) in the presence of a resisting force may be written in the abstract form as

Card 1/3

ACC NR: AT6016796

$$T\ddot{u} + F\dot{u} + Vu = 0, \qquad (1).$$

where u is the vector of some Hilbert space $\mathfrak{H}$, prescribing a shift of the system from a state of equilibrium; T and V are positive, and F the non-negative operators in $\mathfrak{H}$, generated, respectively, by the kinetic and the potential energies of the continuum and its Rayleigh scatter function. The present paper is devoted to a study of the spectrum of Eq. (1) (or, the spectrum of the pencil $L(\mu)$), tests of the energetic completeness of its elementary solutions, and other related problems. The present investigations, for the most part, do not overlap with the fundamental investigations of M.V. Keldysh (Dokl. Acad. nauk SSSR, 1951, 77, No. 1, 11-14) on the theory of operational pencils of arbitrary order, since the latter in application to quadratic pencils is based on other assumptions with respect to the operator B. In applications, when the results of both the investigations are applicable, they complement each other. In addition to relatively recent results in the theory of non-selfadjoint operators, the authors make extensive use of the theory of operators in a space with an indefinite metric. A considerable part of the results of the present work is new even for the case of the system S with a finite number of degrees of freedom. The results are directly applicable to the investigation of small vibrations (motions) of tense strings, rods, membranes, plates, as well as various elastic bodies taking into consideration linear viscous friction, both external and internal.

Card 2/3

L 04620-66
ACC NR: AT6016796

The authors do not attempt to investigate the damped vibrations of some specific continuous mechanical systems; their aim is the development of some new general principles in the investigation of small motions of such systems. It is emphasized, however, that the application of the methods devised is not restricted to damped vibrations (small motions) of elastic solid continua. It is also noted that many questions in the theory of waveguides lead to an investigation of quadratic operational pencils of the type close to that studied in the present work. The results obtained make it possible to develop the theory of forced vibrations for damped continua; the authors, however, do not dwell on that theory. Orig. art. has: 82 formulas.

SUB CODE: 20,12 SUBM DATE: 13Sep65/ ORIG REF: 024/ OTH REF: 007

Card 3/3 gl

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

GOKHBERG, Izrail' TSudikovich; KREYN, Mark Grigor'yevich; SHIROKOV, F.V., red.

[Introduction to the theory of linear non-self-adjoint operators in Hilbert space] Vvedenie v teoriiu lineinykh nesamosopriazhennykh operatorov v gil'bertovom prostranstve. Moskva, Nauka, 1965. 448 p. (MIRA 19:1)

L 25779-66 EWT(d) IJP(c)

ACC NR: AP6016360 SOURCE CODE: UR/0020/65/164/004/0732/0735

23
B

AUTHOR: Gokhberg, I. Ts.; Kreyn, M. G.; Smirnov, V. I. (Academician)

ORG: Institute of Mathematics and Computing Center, AN MoldSSR (Institut matematiki s vychislitel'nym tsentrom AN MoldSSR); Odessa Construction-Engineering Institute (Odesskiy inzhenerno-stroitel'nyy institut)

TITLE: Multiplicative representation of the characteristic functions of operators which are close to unitary operators

SOURCE: AN SSSR. Doklady, v. 164, no. 4, 1965, 732-735

TOPIC TAGS: mathematic operator, mathematics, function

ABSTRACT: The article shows that previous investigations by the authors on the factorization of operators, in conjunction with various investigations of others (V. I. Matsayev, Yu. I. Lyubich, B. Sz.-Nagy, and C. Foias), make it possible to obtain a multiplicative representation of the characteristic functions of operators of a comparatively wide class. The following theorem is formulated: If operator $T \in \mathscr{C}(\mathfrak{S}_\infty)$ with unitary spectrum possesses a proper chain dividing the spectrum, its characteristic function $\theta_T(\lambda)$ permits the multiplicative representation

$$\theta_T(\lambda) = (\theta_T^*(0))^{-1} \int_{\mathfrak{P}} \left(I + \frac{H^{1/2}\,dP\,(I - PHP)^{-1} H^{1/2}}{\lambda e^{i\varphi(P)} - 1} \right),$$

Card 1/2

2

L 25779-66

ACC NR: AP6016360

O

The authors state that the above multiplicative representation is more complex in structure and derivation than that obtained by M. S. Brodskiy for the characteristic operator function of bounded operators with a real spectrum and a completely continuous imaginary component and that the latter can be obtained as a corollary of the above representation. This paper was presented by Academician V. I. Smirnov on 1 March 1965. Orig. art. has: 10 formulas. [JPRS]

SUB CODE: 12 / SUBM DATE: 26Feb65 / ORIG REF: 014 / OTH REF: 001

Card 2/2

KREYN, M.G.

Vitol'd L'vovich Shmul'ian, 1915-1944; on the 50th anniversary of his birth and the 20th anniversary of his death. Usp. mat. nauk 20 no.2:131-133 Mr-Ap '65. (MIRA 18:5)

GOKHBERG, I.TS.; KREYN, M.G.

Criterion of the completeness of a system of root vectors of compression. Ukr. mat. zhur. 16 no.1:78-82 '64.

(MIRA 17:5)

KREYN, M.G.; LANGER, G.K.

Theory of quadratic bundles of self-adjoint operators. Dokl. AN SSSR 154 no.6:1258-1261 F '64. (MIRA 17:2)

1. Odesskiy inzhenerno-stroitel'nyy institut i Drezdenskiy tekhnicheskiy universitet, Drezden, Germanskaya Demokraticheskaya Respublika. Predstavleno akademikom L.S.Pontryaginym.

KREYN, M.G.

New application of the fixed point principle in the theory of operators in a space with an indefinite metric. Dokl. AN SSSR 154 no.5:1023-1026 F'64. (MIRA 17:2)

1. Odesskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom L.S. Pontryaginym.

GORB[illegible]

[illegible]

KREYN, M.G.; DALETSKIY, Yu.L., red.

[Lectures on the theory of stability of the solution of differential equations in a Banach space] Lektsii po teorii ustoichivosti reshenii differentsial'nykh uravnenii v banakhovom prostranstve (otredaktirovannye i dopolnennye) Kiev, AN USSR, In-t matematiki, 1964. 186 p. (MIRA 18:6) [illegible], G. Ya., Assistant Cand Tech Sci

Dissertation: "Investigation of the Conditions for Carbonization of Titanium in Vacuo."

9/10/5[illegible]

Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin

SO Vecheryaya Moskva
Sum 71

MEYERSON, G. A., KREYN, O. Ye.

Chemical Reaction - Mechanism

Investigation of the mechanism of titanium carbide formation in a vacuum. Zhur. prikl. khim. 25 no. 2 (1952).

9. Monthly List of Russian Accessions, Library of Congress, August 1952, UNCL.

KREYN, O.Ye.

ZELIKMAN, A.N.; SAMSONOV, G.V.; KREYN, O.Ye.; STEPANOV, I.S., inzhener, retsenzent; TANANAYEV, I.V., retsenzent; POGODIN, S.A., professor, doktor, zasluzhennyy deyatel' nauki i tekhniki, retsenzent; RODE, Ye.Ye., professor, doktor, retsenzent; ABRIKOSOV, N.Kh, doktor khimicheskikh nauk, retsenzent; SHAMRAY, F.I., doktor khimicheskikh nauk, retsenzent; MOROZOV, I.S., kandidat khimicheskikh nauk, retsenzent; BOOM, Ye.A., kandidat khimicheskikh nauk, retsenzent; NIKOLAYEV, N.S., kandidat khimicheskikh nauk, retsenzent; ZVORYKIN, A.Ya, kandidat khimicheskikh nauk, retsenzent; BASHILOVA, N.I., kandidat khimicheskikh nauk, retsenzent; VYSOTSKAYA, V.N., redaktor; KAMAYEVA, O.M., redaktor; ATTOPOVICH, M.K., tekhnicheskiy redaktor

[Metallurgy of rare metals] Metallurgiia redkikh metallov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1954. 414 p. (MLRA 7:9)

1. Chlen-korrespondent Akademii nauk SSSR (for Tananayev)
(Metals, Rare--Metallurgy)

KREYN, O. Ye.

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 16/22

Authors : Zelikman, A. N., and Kreyn, O. Ye.

Title : Thermal dissociation of MoS_2

Periodical : Zhur. fiz. khim. 29/11, 2081-2085, Nov 1955

Abstract : The elasticity of MoS_2 (molybdenum disulfide) was investigated at temperatures ranging from 800 to 1,100° by means of a static method on the basis of the equilibrium composition of the gaseous phase during the reduction of MoS_2 with hydrogen. The results obtained were compared with those of N. Parravano (Italy) and K. K. Kelley (USA) and found to correspond perfectly with each other. Ten references: 4 USSR, 3 French, 2 Ital. and 1 USA (1900-1950). Tables; graph; drawing.

Institution : Moscow Inst. of Non-Ferrous Metals and Gold

Submitted : May 24, 1955

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826420(

KREYN, O. YE.

137-58-5-8788

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 8 (USSR)

AUTHORS: Zelikman, A. N., Belyayevskaya, L. V., Kreyn, O. Ye.

TITLE: A Study of FluoSolids Roasting of Molybdenite Concentrates (Izucheniye protsessov obzhiga molibdenitovykh kontsentratov v kipyashchem sloye)

PERIODICAL: Tr. Tekhn. soveshchaniya po obzhigu materialov v kipyashchem sloye. Moscow, Metallurgizdat, 1956, pp 75-96

ABSTRACT: A presentation of results of studies of oxidation rates of molybdenite and of its interaction with MoO_3, as well as of the interaction of MoO_3 with CuO, CaO, FeO, and ZnO and of the solubility in ammonia of molybdates formed in the process. The process of FluoSolids roasting was studied in a laboratory furnace with a cross section of 400x150 mm. The following was established: optimal temperature: 585°-595°C; specific output of the hearth: 1.5-1.6 t/m^2; extent of dust removal: 38-42 percent; it was also established that the roasting process may be carried out without fuel by means of utilizing the heat from the reactions. Chemical composition and results of leaching of cinder (which results from the FluoSolids roasting process)

Card 1/2

137-58-5-8788

A Study of FluoSolids Roasting of Molybdenite Concentrates

are shown, together with analogous information for an industrial roasting process carried out in a rotary furnace. Extraction of Mo from cinder, produced in the course of a process of FluoSolids roasting, is 92.0-93.5 percent as compared to the 79.0-79.5 percent achieved in the industrial process. The amounts of tailings from the two processes constitute 20-22 percent and 36-38 percent, respectively.

A. P.

1 Molybdenum ores--Processing 2. Molybdenum ores--Properties

Card 2/2

KREYN, O.Ye.

ZELIKMAN, A.N.; BELYAYEVSKAYA, L.V.; KREYN, O.Ye.

Study of the roasting process of molybdenite concentrates in a boiling fuel bed. TSvet. met. 29 no.8:14-22 Ag '56.

(MLRA 9:10)

(Molybdenite) (Ore dressing)